

WHAT IS CLAIMED IS:

1. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof inhibits the binding of human CD40L to human CD40-human Fc fusion protein by less than about 28% when assayed in an
5 in vitro ELISA assay under conditions wherein the antibody and human CD40L are added at equal concentrations (w/v).
2. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof inhibits the binding of human CD40L to a human CD40-human Fc fusion protein by less than about 47% when assayed in
10 an in vitro ELISA assay under conditions wherein the antibody and human CD40L concentration (w/v) are at a ratio of 2:1.
3. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof substantially induces the proliferation of tonsillar B-cells in vitro without the addition of IL-4.
- 15 4. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof substantially induces the proliferation of tonsillar B-cells in vitro without the addition of IL-4, wherein the proliferation efficiency is about 250% or greater than that induced by G28-5 antibody without the addition of IL-4, when the concentration of antibody is in the range of 0.01
20 $\mu\text{g/ml}$ to 1 $\mu\text{g/ml}$.
5. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof substantially induces the proliferation of tonsillar B-cells in vitro without the addition of IL-4, wherein the proliferation efficiency is about 250 to 800% greater than that induced by G28-5 antibody
25 without the addition of IL-4, when the concentration of antibody is in the range of 0.01 $\mu\text{g/ml}$ to 1 $\mu\text{g/ml}$.
6. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof induces the proliferation of tonsillar B-cells in vitro, wherein the proliferation efficiency is about 62% or greater than that

induced by G28-5 antibody, when the concentration of antibody is in the range of 0.01 µg/ml to 1 µg/ml in the presence of IL-4.

7. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof induces the proliferation of tonsillar B-cells in vitro, wherein the proliferation efficiency is about 62 to 87% greater than that induced by G28-5 antibody, when the concentration of antibody is in the range of 0.01 µg/ml to 1 µg/ml in the presence of IL-4.
8. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof inhibits CD40L (1 µg/ml) mediated tonsillar B cell proliferation in vitro, wherein the inhibitory efficiency leads to about 50 to 95% or greater reduction in B cell proliferation when the concentration of the antibody is in the range of 0.01 µg/ml to 10 µg/ml.
9. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof inhibits CD40L (1 µg/ml) mediated tonsillar B cell proliferation in vitro, wherein the inhibitory efficiency leads to about a 85 to 95% or greater reduction in B cell proliferation when the concentration of the antibody is in the range of 0.1 µg/ml to 10 µg/ml.
10. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof inhibits CD40L (1 µg/ml) mediated tonsillar B cell proliferation in vitro, wherein the inhibitory efficiency leads to about 80 to 95% or greater reduction in B cell proliferation when the concentration of the antibody is in the range of 0.01 µg/ml to 10 µg/ml.
11. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody or a functional fragment thereof inhibits CD40L (1 µg/ml) mediated tonsillar B cell proliferation in vitro, wherein the inhibitory efficiency leads to about a 95% or greater reduction in B cell proliferation when the concentration of the antibody is in the range of 0.1 µg/ml to 10 µg/ml.
12. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody comprises the heavy chain variable region encoded by the nucleic acid

sequence of SEQ. ID. 14 and the light chain variable region encoded by the nucleic acid sequence of SEQ ID 15.

13. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody comprises the heavy chain variable amino acid sequence of SEQ ID 16 and the light chain variable amino acid sequence of SEQ ID 17.
14. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody comprises the heavy chain variable amino acid sequence and light chain variable amino acid sequence of the antibody produced by hybridoma F5-77.
15. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody is a recombinant antibody that comprises the heavy chain variable region and light chain variable region encoded by the nucleic acids isolated from hybridoma F5-77.
16. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody is selected from the group consisting of: a) an antibody comprised of the heavy chain variable region encoded by the nucleic acid sequence of SEQ ID 10 and the light chain variable region encoded by the nucleic acid sequence of SEQ ID 11, or b) an antibody comprised of the heavy chain variable region encoded by the nucleic acid sequence of SEQ ID 12 and the light chain variable region encoded by the nucleic acid sequence of SEQ ID 13.
17. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody is comprised of the heavy chain variable amino acid sequence and the light chain variable amino acid sequence of the antibody produced by hybridoma F1-102, F5-152, F2-103, F5-157, 72, or F4-465.
18. An anti-human CD40 antibody or a functional fragment thereof, wherein the antibody is a recombinant antibody that comprises the heavy chain variable region and the light chain variable region encoded by the nucleic acids isolated from hybridoma F1-102, F5-152, F2-103, F5-157, 72, or F4-465.

19. An anti-human CD40 antibody or a functional fragment thereof, wherein the binding specificity to CD40 and its epitope thereof are the same as an antibody selected from claims 1 through 18.
- 5 20. The anti-human CD40 antibody or a functional fragment thereof of claims 1 through 19 wherein the heavy chain variable region and the light chain variable region of the antibody are the product of a human-derived antibody gene.
21. A pharmaceutical composition comprising at least one anti-human CD40 antibody or a functional fragment thereof selected from claims 1 through 20.
- 10 22. An isolated DNA molecule encoding the heavy chain variable amino acid sequence of SEQ ID 16.
23. The isolated DNA molecule of claim 16, wherein the DNA sequence comprises SEQ ID 14.
24. An isolated DNA molecule encoding the light chain variable amino acid sequence of SEQ ID 17.
- 15 25. The isolated DNA molecule of claim 16, wherein the DNA sequence comprises SEQ ID 15.
26. An isolated DNA molecule encoding the heavy chain variable amino acid sequence of the antibody produced by the hybridoma F1-102, F5-77, F5-152, F2-103, F5-157, 72, or F4-465.
- 20 27. An isolated DNA molecule encoding the light chain variable amino acid sequence of the antibody produced by the hybridoma F1-102, F5-77, F5-152, F2-103, F5-157, 72, or F4-465.
28. An isolated DNA molecule wherein the DNA sequence comprises SEQ ID 10, SEQ ID 11, SEQ ID 12, SEQ ID 13, SEQ ID 14 or SEQ ID 15.
- 25 29. An isolated polypeptide comprising a polypeptide having SEQ ID 16 or SEQ ID 17.

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Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	